REMARKS

Claim 4 was rejected under 35 U.S.C. 102(b) over Suzaki, U.S. 5,325,225, as set forth in paragraph 3 of the Office Action. Claim 4 was rejected under 35 U.S.C. 103 over Trinks, U.S. 6,023,329, as set forth in paragraph 5 of the Office Action. In paragraph 6, claim 6 was rejected under 35 U.S.C. 103 over Tashiro, U.S. 5,946,090. Applicant respectfully traverses these rejections as described in detail below.

Suzaki discloses a semiconductor laser 1 that outputs light having a uniform optical intensity and a uniform oscillation wavelength. A modulator 2 changes the intensity of the laser's output light according to a modulation signal I_m in a manner that ordinarily causes a shift in the laser output light's wavelength. More specifically, Figure 3 indicates that during transitions of the laser light's optical intensity from one level to another, the light's wavelength shifts up or down depending on whether the intensity is increasing or decreasing. Thus, while the width of the light's wavelength may be the same at any given time, the modulated laser light exists as multiple wavelengths over time.

To pre-empt this shift, the Suzaki system introduces a compensating signal to the laser's bias current I_B. As shown in Figures 3(C) and 3(D), the compensating signal creates a wavelength shift in the laser light opposite to the shift that will occur in modulator 2. Thus, the compensating wavelength shift cancels out the modulation shift, and the resulting modulated light signal is uniform in wavelength, as indicated in Figure 3(E).

The Suzaki system operates upon a wavelength shift that is known in view of the modulator's input signal, and Suzaki can therefore inject a correction based upon that signal. Suzaki, does not, however, compensate for spectral changes that occur as a result of system changes. Assume, for example, that the operation of the Suzaki laser light source were to

change such that the laser's output light changes. The Suzaki system would still compensate the now - incorrect laser output signal for the wavelength shift imparted to it by the modulator, but it would not address the underlying change in the laser light source.

Claim 4 has been amended to clarify that the modulation of the wavelength spectrum is based upon the recited relationship and the intensity of detected light actually output from the light source. In contrast, there is no disclosure or teaching in Suzaki to modify a wavelength spectrum based on such a detected signal and a relationship between intensity of the light signal and a difference between the wavelength spectrum and an expected wavelength spectrum. For at least this reason, claim 4 is allowable over Suzaki.

Trinks, U.S. 6,023,329, discloses a system in which a laser light source 18 outputs light to a reference cell 29 containing Rubidium atoms and to a test section 13 also containing Rubidium atoms. A laser controller 44 sweeps the laser's intensity, and also the light's wavelength, to thereby allow the system to scan an absorption line in the absorption spectrum of the Rubidium atoms.

An interferometer 31 is used to determine the laser light's wavelength at a given time by splitting the laser light, passing one of the split beams through an optical path greater than that of the other beam, and then superimposing the two beams back together again. The intensity of the resulting signal varies in a manner corresponding to the varying wavelengths, thereby apparently allowing identification of the wavelength at a given time. There is no disclosure in Trinks, however, of a relationship between light signal intensity and a difference between a light signal's wavelength spectrum and an expected wavelength spectrum, nor, as noted in the Office Action, is there disclose of any steps to compensate for a change in wavelength spectrum. The recognition in Trinks that the injection current of a laser may be

varied to control the laser's output light intensity and wavelength (which in Trinks is intentional) is not a recognition or teaching that wavelength spectrum modification can be based on an output light signal's detected intensity and a relationship between the light's intensity and a difference between the light's wavelength spectrum and an expected wavelength spectrum. For at least this reason, claim 4 is allowable over Trinks.

Tashiro, U.S. 5,946,090, discloses an electrically tuned tunable laser comprised (referring to Figure 5) of a tunable laser medium 14 that, when excited by an excitation laser beam 24, outputs a light beam to an acousto-optic element 100. An RF power source 20 drives a piezoelectric element 22 attached to element 100 to thereby prorogate an acoustic wave across the acousto-optic element. A light component incident upon element 100 and having a specific wavelength related to the frequency of the acoustic wave is strongly diffracted at an angle toward a total reflection mirror 110 to then pass back to the tunable laser medium. The arrangement thereby permits only light having a desired frequency to reciprocate through the laser medium to induce laser oscillation.

RF power source 20 can affect the laser output in at least two ways. First, selection of the RF signal frequency determines the laser oscillation wavelength (see column 11, lines 30-34). Second, selection of the RF signal's amplitude determines the output laser light intensity (see column 11, lines 35-41).

Figures 7 and 8 respectively illustrate these relationships. Column 7 (and referring to column 14, lines 1-20) illustrates the output power (y-axis) and wavelength (x-axis) of the laser output light as the frequency of an RF power source tunable from 40 MHz to 150 MHz is varied. The power of the RF signal is held constant at 2W, and the excitation laser beam energy is defined at 155 mJ per pulse. That is, the RF signal produces a laser light output that

is tunable within a range of about 750 nm to about 850 nm but that exhibits no output power beyond this range. The particular laser output wavelength within the tunable range can be determined by selecting the RF frequency.

In contrast to Figure 7, Figure 8 (and referring column 14, lines 21-31) illustrates the effect of varying the RF signal power. As indicated in the Figure, variation in the RF signal source power translates to a change in laser output power.

Tashiro further discloses that such a tunable laser can be used in certain applications. As illustrated in Figure 16, for example, a controlling device 141 switches the laser's wavelength so that the laser alternately oscillates at first and second frequencies which are swept higher or lower while keeping the difference between the two frequencies constant.

Tashiro, does not, however, disclose or teach the definition of a relationship between change in spectral shape over the wavelength range applied to a measurement sample and change in input power to the light source. Figure 7 illustrates the tunable range of the laser light given a constant RF signal power and a given excitation laser beam energy. It does not describe a relationship between change in input power and change in spectral shape. Figure 8, which relates RF signal power to laser power, also fails to disclose such a relationship. For at least this reason, claim 6 is allowable over Tashiro.

Claim 5 has been amended in accordance with the amendment to claim 4.

Applicant submits that the application is in condition for allowance. Favorable action, and withdrawal of the outstanding rejections, is therefore respectfully requested. The Examiner is requested to contact the undersigned at his convenience should any issues remain.

Respectfully submitted,

NELSON MULLINS RILEY
& SCARBOROUGH, L.L.P.

Lloyd G. Farr
Registration No. 38,446

1320 Main Street
Columbia, SC 29201
(404) 817-6165
Fax (803) 255-9831